PROJECT NUMBER: 1730
PROJECT TITLE: Plant, Cell & Tissue Culture Research
PROJECT LEADER: I. L. Uydess
PERIOD COVERED: September, 1988

I. TOBACCO-IDENTICAL PRESERVATIVES

A. Objective: To develop procedures and to establish microbiological screens for the evaluation of new, nature-identical preservatives as replacements for and/or as adjuncts to propylparaben.

B. Status:

Phase I Screens:

The C-10 and C-12 fatty acid alcohols have been evaluated in the Phase I shake-flask assay using propylparaben and the C-10 and C-12 fatty acids as controls. Both decanol and dodecanol have been found to exhibit approximately the same antimicrobial activity as decanoic and dodecanoic (lauric) acids, totally inhibiting the growth of B. coagulans (PM-13) at levels between 50 and 100 μg/ml.

Benzoic acid and sodium benzoate were also tested in comparison to propylparaben and a decanoic acid control. Each of the benzoate compounds exhibited marginal antimicrobial activity at 100 - 250 μg/ml, producing a half-maximal inhibition of growth similar in effect to that of the 150 μg/ml paraben control. The 100 μg/ml decanoic acid control completely inhibited the growth of the target organism, PM-13.

Phase III Screens:

Preliminary trials were begun in 5-liter fermentors in support of the development of standard operating procedures for a Phase III, fermentor-based screen. Four liter aliquots of fresh, Park 500 SEL (line 2 evaporator feed tank) were incubated at 37°C at both high and low mixing (aeration) rates to encourage spoilage. The SEL in the low agitation (more anaerobic) fermentor spoiled at a faster rate than did the SEL in the higher agitation (aerobic) fermentor based upon an increase in pH, colony forming units (CFUs) and odor.

In support of this, a meeting was held with Tom Long, Laura Singletary and Cindy Rustin of Park 500 to discuss and plan a collaborative research effort in which a Park 500 model system would be constructed in the R&D labs to mimic the major physical parameters that exist surrounding the cleaner feed (CFT) and evaporator feed tanks (EFT) at Park 500. The model system would be used to help evaluate spoilage under a variety of experimental situations as well as to examine the efficacy of prospective preservatives in SEL under more realistic (process-like) conditions in the laboratory.

C. Conclusions: None to be reported at this time.

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D. Plans: October, 1988

1. Further evaluations of the fatty acid alcohols in conjunction with fatty acids will be conducted.

2. The C-10 and C-12 fatty acid alcohols will be tested in the Phase II, SEL shake-flask assay.

3. Evaluations of the C-10 and C-12 fatty acids and fatty acid alcohols will be initiated in the Phase III fermentor screen.

4. Dissolved oxygen, pH and temperature measurements will be made by Project 1730 and Park 500 personnel at selected locations in Line 2 of Park 500 in support of the design and establishment of a Park 500 model system at the R&D labs.

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